1979

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Senta, T., Kumagai, S., & Castillo, N. (1979). Occurrence of milkfish, Chanos chanos (Forsskal) eggs around Panay Island, Philippines. SEAFDEC Aquaculture Department Quarterly Research Report, 3(2), 19–22.

http://hdl.handle.net/10862/2349

# Occurrence of milkfish, *Chanos chanos* (Forsskal) eggs around Panay Island, Philippines

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On three occasions during his numerous cruises in the Java Sea, Delsman (1926, 1929) found 15 pelagic fish eggs which had the following characteristics: a diameter of 1.2 mm, a finely segmented and slightly yellowish yolk, no special structures on the chorion, and no oil globules. Believing these to be of milkfish, he described and illustrated the eggs and the larvae from just after hatching up to the fourth day. His identification was proven correct by the recent success in the artificial insemination of milkfish eggs by Vanstone et al., (1977) and Chaudhuri et al., (1977, 1978).

During the four-year period from April 1976 to June 1979, the present authors have made a total of 1,663 larval net tows in the waters around Panay Island (Fig. 1), 1304 in Cuyo East Pass, 171 in Panay Gulf, 114 in the Visayan Sea, 58 in the Sibuyan Sea and 16 around the Cagayan Islands. Larval net operations were most extensive in Cuyo East Pass for two reasons: (1) Antique is one of the most productive fry grounds in the Philippines, and (2) the first milkfish eggs ever recorded from Philippine waters were found around Batbatan Island in April 1976. Efforts to collect eggs were more extensive in March, April, May and June since the main spawning season of milkfish falls on these months.

A total of 551 milkfish eggs was collected during the study period: 89 in 1976, 198 in 1977, 82 in 1978 and 182 in 1979. Table 1 compares the occurrence of milkfish eggs in the five areas in March, 1976 – June, 1979 inclusive.

Most of the eggs, 545 out of 551, were obtained from Cuyo East Pass. In most cases, the eggs occurred in small numbers, ten or less in a tow. The maximum number so far obtained in a single tow was 33 eggs. These figures seem to be very small when the two facts are considered: (1) milkfish has a high fecundity, 3.1-5.7 million eggs (Schuster, 1960), and (2) Antique is one of the best fry grounds in the country. It is either that the areas surveyed did not cover the main spawning grounds of milkfish or that milkfish do not spawn in large schools, but in pairs, or at most, in small schools distributed sporadically over a vast sea. In the latter case, the population density of the eggs in a given area at a given time would not be very high and the distribution of eggs would be very patchy.

Table 2 shows the monthly occurrence of milkfish eggs in this area; the greatest mean number of eggs per tow (0.73) was in April. It is remarkable that this peak of egg occurrence is about a month ahead of the peak of fry occurrence in Antique which is in May. Very often the eggs occurred in shallow waters around islands or islets such as Batbatan, Seco, Maralison and Maniguin (Fig. 1). Some larval net tows at stations close to the Antique coast, such as off Pucio Point, off Pandan and off Hamtic, also yielded some eggs. Furthermore, eggs were also found at two locations quite remote from land (12.4 km and 23.4 km away) and rather deep (380 m and 900 m, respectively).

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The waters around the Cagayan Islands were surveyed only in June 1977, with 16 tows at 14 locations and 5 milkfish eggs were found from 2 locations. In the Sibuyan Sea, a single milkfish egg was recovered near Zapato Island. No milkfish eggs were obtained from either Panay Gulf or the Visayan Sea, despite rather extensive larval net operations in these areas, particularly in the waters off the southwestern coast of Guimaras and off Estancia.

The milkfish eggs were found in waters of a wide range of depth, from as shallow as 10 m to as deep as 900 m, although mot of them were from waters down to 200 m deep. Majority of the eggs was found within a few kilometers from land, except the two cases previously mentioned. The water temperatures and salinities at locations of egg recovery ranged from 26.7°C to 30.8°C, and from 32.9 ppt to 34.5 ppt, respectively.

The feature that Schuster (1960) noted to be characteristic of milkfish spawning grounds -- locations with clear, shallow water and sandy or coralline bottom, situated at distances not more than 30 km from shore -- apply well to most of the locations where the majority of the eggs in the present study were found. Still, considerable number of eggs (24) were found at locations deeper than 200 m. Whether such eggs have been drifted from shallow spawning grounds, or milkfish also spawn in such deep water remains unclear.

Simultaneous horizontal tows at the surface and subsurface water layers up to 20 m deep showed that milkfish eggs are rather evenly distributed from the surface down to at least 20 m. Here may lie some of the answers to the problem on the mechanism of larval transport and movement.

All preserved milkfish were examined for their developmental stages. Although a considerable number of larval net towings were made at night (2300H to 0200H), besides extensive daytime operations, milkfish eggs were obtained only between 0400H and 1800H. The eggs found in the early morning collections were in the early stages of development; those found later in the day were more advanced. Almost all the eggs brought back alive to the laboratory hatched at about 1900-2000H. Based on the developmental stages of the recovered eggs and the time of collection, it seems reasonable to conclude that spawning in the wild takes place at midnight and that the incubation period is about 20 hours, a little shorter than that in the laboratory.

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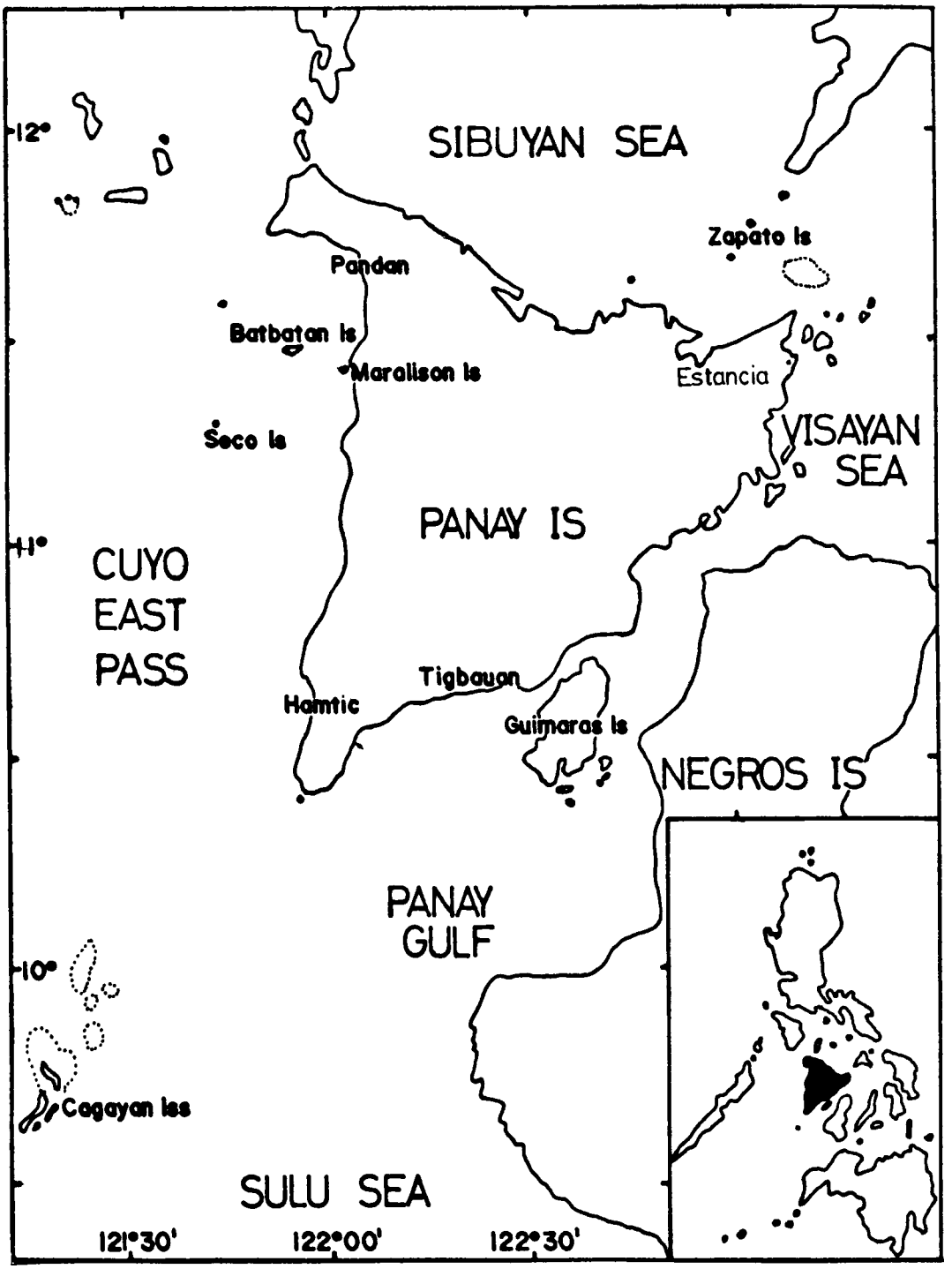


Fig. 1. The areas covered by the milkfish egg collection surveys in the Philippines, 1976-1979.

Table. 1. The number of milkfish eggs collected in March-June, 1976-1979, by areas.

| Areas | Cuyo East Pass | Cagayancillo waters | Panay Gulf | Visayan Sea | Sibuyan Sea | Total |
|---|---|---|---|---|---|---|
| No. of eggs | 544 | 5 | 0 | 0 | 1 | 550 |
| No. of tows | 1240 | 16 | 168 | 105 | 58 | 1587 |
| No. of eggs per tow (%) | 0.44 | 0.31 | 0 | 0 | 0.02 | 0.35 |

Table 2. The monthly occurrence of milkfish eggs in Cuyo East Pass from 1976 to 1979.

| Month | F | M | A | M | J | J | A | S | O | N | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| No. of eggs | 0 | 72 | 323 | 123 | 26 | 0 | 0 | 0 | 1 | 0 | 545 |
| No. of tows | 25 | 160 | 443 | 416 | 196 | 4 | 22 | 10 | 23 | 5 | 1304 |
| No. of eggs per tow (%) | 0 | 0.45 | 0.73 | 0.29 | 0.13 | 0 | 0 | 0 | 0.04 | 0 | 0.42 |